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510(k) SUMMARY

APS Series Dialyzers

Submitter:

Asahi Medical Company, Ltd.
9-1, Kanda Mitoshirocho
Chiyoda-ku, Tokyo 101-8482
Japan

Date summary was prepared:

February 24, 2000

Name(s) of the device:

Asahi APS Series Dialyzers

Identification of predicate device(s):

Fresenius High Flux Polysulfone ("Hemoflow") Hemodialyzers

Description of the device:

The line of Asahi Polysulfone (APS) Series Dialyzers is a family of high permeability hollow fiber dialyzers intended for the treatment of patients with acute or chronic renal failure. The APS Dialyzers are designed for both single use or for reuse with a maximum of 15 reprocessing reuse cycles per patient. They are constructed of reusable, hollow fiber (polysulfone) membranes, housed within a plastic casing of styrene butadiene block polymer and are gamma sterilized prior to shipment.

The APS dialyzers are offered for sale in both a "wet" and a "dry" model. The wet and dry dialyzers are identical to each other except that the wet models are filled at the factory with a fluid to facilitate priming by the user and the dry models are not filled. The use of a wet or dry dialyzer is a matter of user preference.

Intended Use:

A. APS Series Dialyzers are intended for use for hemodialysis treatment of patients who have chronic renal failure or acute renal failure.

B. APS Series Dialyzers must be used in accordance with the instructions of a physician familiar with hemodialysis and familiar with the conditions of the patient.

C. APS Series Dialyzers have been tested *in vitro* and in confirmatory clinical studies under single or initial use and under reprocessing and reuse conditions for up to 15 reuse cycles. Based on the results from these evaluations, Asahi's APS Series Dialyzers may be reprocessed for reuse on the same patient. If reprocessing and reuse is practiced, it is

recommended that the reuse be done under the conditions as existed in the *in vitro* and confirmatory clinical studies as recommended immediately below. It is noted that the Asahi APS Series Dialyzers have not been tested for reuse when reprocessed with agents and/or processes other than these, and the performance of the dialyzers under other conditions are not known and cannot be recommended. Accordingly:

(1) The reprocessed dialyzer may be used only if the residual Total Cell Volume (TCV) is at least 80% of the original TCV and if such dialyzer otherwise meets the acceptance criteria of these instructions for use and the instructions of the reprocessing system utilized. Furthermore, the policies, instructions, and criteria of the institution for reuse (e.g., concerning dialyzer performance, residual blood, and/or dialyzer leakage or damage) should be followed.

(2) The reprocessing agent may be either (a) 4% formaldehyde (also known as formalin) in conjunction with the Seratronics Dialyzer Reprocessing Systems for Dialyzer Reprocessing and Preparation (DRS4™ and DPS4™), manufactured by Seratronics, Inc., or (b) Renalin® in conjunction with the Renatron® Dialyzer Reprocessing System (RS 8300), manufactured by Renal Systems, Inc.3.

(3) The instructions provided by the manufacturer of the chosen reprocessing agent must be followed in reprocessing the dialyzer.

(4) The reprocessed dialyzer may be used only on dialysis systems equipped with volumetric ultrafiltration controllers.

Comparison To Predicate:
The APS Series Dialyzers are technologically comparable to the Fresenius High Flux Polysulfone ("Hemoflow") Hemodialyzers. Both are high permeability dialyzers with the same type of membrane material and the same intended use.

Non-Clinical Testing:
In accordance with FDA's *Guidance for the Content of Premarket Notifications for Conventional and High Permeability Hemodialyzers* and the *Guidance for Hemodialyzer Reuse Labeling*, the performance of selected models of the APS Series Dialyzers were evaluated under reuse conditions. The family of dialyzers, as they will be constituted under this 510(k), are all high permeability hemodialysis membranes. Accordingly, the following nonclinical testing has been conducted for dialyzers reprocessed with formalin and for dialyzers reprocessed with Renalin®:

A. The largest wet model (APS –105EX) was subjected to the reprocessing agent and/or process a minimum of 15 times and subsequently tested for biocompatibility. Biocompatibility tests included: cytotoxicity, sensitization, irritation or intracutaneous reactivity, systemic toxicity (acute), genotoxicity, hemocompatibility, and pyrogenicity.

B. The smallest wet model (APS-40S), a medium size wet model (APS-65E) and the largest wet model (APS-105EX) were tested *in vitro* under initial use and reprocessed/reused conditions for up to 15 cycles using outdated human blood from a blood bank to produce *in vitro* measurements of ultrafiltration coefficient (K_{UF}) and clearances for urea,

creatinine, and vitamin B_{12}. Reflecting the dominant use pattern in modern homodialysis facilities, the *in vitro* performance testing was performed using dialysis machines (COBE Centry III) equipped with volumetric ultrafiltration controllers. Also, to evaluate the effects of reprocessing, widely utilized reprocessing agents [formaldehyde (also known as formalin) and Renalin®] and the associated automated reprocessing systems (Seratronics machine and Renatron® machine, respectively) were used.

Clinical Testing:
In accordance with FDA's *Guidance for the Content of Premarket Notifications for Conventional and High Permeability Hemodialyzers* and the *Guidance for Hemodialyzer Reuse Labeling*, the performance of selected models of the APS Series Dialyzers were evaluated under reuse conditions. The family of dialyzers, as they will be constituted under this 510(k), are all high permeability hemodialysis membranes. Accordingly, a reasonably large wet model (APS-90S) was tested in confirmatory clinical studies under initial use and reprocessed/reused conditions for up to 15 cycles to produce clinical measurements of ultrafiltration coefficient (K_{UF}) and removal rates for urea, creatinine, and albumin. To evaluate the effects of reprocessing, widely utilized reprocessing agents [formaldehyde (also known as formalin) and Renalin®] and the associated automated reprocessing systems (Seratronics machine and Renatron® machine, respectively) were used.

Specifically, two clinical sites were chosen to study the effects of reprocessing the dialyzers with the two chosen reprocessing agents and/or processes. The reprocessing was performed in accordance with the instructions of the manufacturer of the reprocessing machines used at the respective institutions. The clinical study protocol was identical for both sites, although dialysis sessions were conducted and patients were managed in accordance with established dialysis practices for the respective institutions.

The study was a prospective study. The initial dialysis procedures served as the baselines for comparison for the subsequent dialysis procedures performed with the reprocessed devices. The study continued at each site until a minimum of 12 patients were enrolled at the site, of which a minimum of 50% reused the dialyzer 15 times. The main inclusion criteria were patients who receive chronic dialysis and who are stable on thrice weekly dialysis.

Conclusion:
The design, intended use and materials of fabrication of the APS Series Dialyzers are similar to the Fresenius High Flux Polysulfone ("Hemoflow") Hemodialyzers. Therefore, from the perspective of technological characteristics, the APS Series Dialyzers are substantially equivalent to the Fresenius High Flux Polysulfone ("Hemoflow") Hemodialyzers.

The performance characteristics of the APS Series Dialyzers for single or initial (first) use and after reprocessing for reuse, as reflected in the biocompatibility testing, *in vitro* performance testing and confirmatory clinical testing, are comparable to the performance characteristics of the Fresenius High Flux Polysulfone ("Hemoflow") Hemodialyzers. The single or initial (first) use, as well as reuse performance characteristics the APS Series Dialyzers will be included in the device labeling, providing clinical users accurate information on the performance of these membranes which may then be compared to predicate labeling. Therefore, from the perspective

of performance characteristics, the APS Series Dialyzers are substantially equivalent to the Fresenius High Flux Polysulfone ("Hemoflow") Hemodialyzers.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
9200 Corporate Boulevard
Rockville MD 20850

AUG 1 6 2000

Asahi Medical Co., Ltd.
c/o David L. West, Ph.D.
Quintiles Consulting
1801 Rockville Pike
Suite 300
Rockville, Maryland 20852

Re: K001250
Multiple Use Labeling for the
APS Series Hemodialyzers (wet models)
APS-40M, APS-40S, APS-40E, APS-40EX
APS-55M, APS-55S, APS-55E, APS-55EX
APS-65M, APS-65S, APS-65E, APS-65EX
APS-75M, APS-75S, APS-75E, APS-75EX
APS-90M, APS-90S, APS-90E, APS-90EX
APS-105M, APS-105S, APS-105E, APS-105EX
APS Series Hemodialyzers (dry models)
APS-40M--D, APS-40S--D, APS-40E--D, APS-40EX--D
APS-55M--D, APS-55S--D, APS-55E--D, APS-55EX--D
APS-65M--D, APS-65S--D, APS-65E--D, APS-65EX--D
APS-75M--D, APS-75S--D, APS-75E--D, APS-75EX--D
APS-90M--D, APS-90S--D, APS-90E--D, APS-90EX--D
APS-105M--D, APS-105S--D, APS-105E--D, APS-105EX--D
Dated: July 19, 2000
Received: July 19, 2000
Regulatory Class: II
21 CFR §876.5860/Procode: 78 KDI

Dear Dr. West:

We have reviewed your Section 510(k) notification of intent to market the device referenced above and we have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (Premarket Approval), it may be subject to such additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 895. A substantially equivalent determination assumes compliance with the Current Good Manufacturing Practice requirements, as set forth in the Quality System Regulation (QS) for Medical Devices: General regulation (21 CFR Part 820) and that, through periodic QS inspections, the Food and Drug Administration (FDA) will verify such assumptions. Failure to comply with the GMP regulation may result in regulatory action. In addition, FDA may publish further announcements concerning your device in the Federal Register. Please note: this response to your premarket notification submission does not affect any obligation you might have under sections 531 through 542 of the Act for devices under the Electronic Product Radiation Control provisions, or other Federal laws or regulations.

This letter will allow you to begin marketing your device as described in your 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801 and additionally 809.10 for in vitro diagnostic devices), please contact the Office of Compliance at (301) 594-4591. Additionally, for questions on the promotion and advertising of your device, please contact the Office of Compliance at (301) 594-4639. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR 807.97). Other general information on your responsibilities under the Act may be obtained from the Division of Small Manufacturers Assistance at its toll-free number (800) 638-2041 or (301) 443-6597 or at its internet address "http://www.fda.gov/cdrh/dsma/dsmamain.html".

Sincerely yours,

Daniel G. Schultz, M.D.
Captain, USPHS
Director, Division of Reproductive,
Abdominal, and Radiological Devices
Office of Device Evaluation
Center for Devices and
Radiological Health

Enclosure(s)

Indications For Use Statement

510(k) Number: None assigned as of this time

Device Name: Asahi APS Series Dialyzers

Indications for Use:

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Concurrence of CDRH, Office of Device Evaluation (ODE)

☒ Prescription Use (per 21 CFR 801.109)

☐ Over-the Counter Use

(Division Sign-Off)
Division of Reproductive, Abdominal, ENT,
and Radiological Devices
510(k) Number K001250